

Review of *Bicarini*bracon Quicke & Walker and *Chelonogastra* Ashmead (Hymenoptera, Braconidae, Braconinae) in China, with the description of two new species

Yang Li¹, Cornelis van Achterberg², Cheng-Jin Yan³, Xue-Xin Chen²

1 Sichuan Provincial Key Laboratory for Development and Utilization of Characteristic Horticultural Biological Resources, College of Chemistry and Life Sciences, Chengdu Normal University, Chengdu 611130, China

2 State Key Laboratory of Rice Biology and Breeding, Ministry of Agriculture Key Lab of Molecular Biology of Crop Pathogens and Insects, Zhejiang Key Laboratory of Biology and Ecological Regulation of Crop Pathogens and Insects, and Institute of Insect Sciences, Zhejiang University, Hangzhou 310058, China **3** Wenzhou Vocational School of Science and Technology, Wenzhou 325006, China

Corresponding author: Xue-Xin Chen (xxchen@zju.edu.cn)

Academic editor: J. M. Jasso-Martínez | Received 8 October 2024 | Accepted 4 November 2024 | Published 26 November 2024

<https://zoobank.org/D846F64B-3D9B-4E46-B6EE-992147EAD5BC>

Citation: Li Y, van Achterberg C, Yan C-J, Chen X-X (2024) Review of *Bicarini*bracon Quicke & Walker and *Chelonogastra* Ashmead (Hymenoptera, Braconidae, Braconinae) in China, with the description of two new species. Journal of Hymenoptera Research 97: 1285–1299. <https://doi.org/10.3897/jhr.97.138683>

Abstract

The species of two genera (*Bicarini*bracon Quicke & Walker and *Chelonogastra* Ashmead) of the subfamily Braconinae (Hymenoptera, Braconidae) from China are reviewed and 6 species are recognized, including 2 new species (*Bicarini*bracon *concolor* **sp. nov.** and *Chelonogastra* *rugosa* **sp. nov.**), which are described and illustrated. *Bicarini*bracon *carini* Chishti & Quicke, 1993 is reported from China for the first time. Keys to the Chinese species of the genera *Bicarini*bracon and *Chelonogastra* are provided.

Keywords

Aphrastobraconini, Braconini, new record, new species, Oriental

Introduction

*Bicarini*bracon Quicke & Walker, 1991, and *Chelonogastra* Ashmead, 1900 are two small genera of the subfamily Braconinae (Hymenoptera: Braconidae) with 5 and 8 described species worldwide, respectively (Yu et al. 2016). Both genera used in the tribe

Braconini Nees, but now belong to the tribe Aphrastobraconini Ashmead (Quicke et al. 2023). *Bicariniibracon* occurs in the Oriental and Australasian regions, and *Chelonogastra* mainly in the Afrotropical, Eastern Palearctic and Oriental regions (Yu et al. 2016). The biology of both genera is still unknown. In this paper, we report three *Bicariniibracon* species in China, of which one species is new to science (*B. concolor* sp. nov.) and one species is new to China (*B. tricarinatus* (Cameron, 1897)), and three *Chelonogastra* species in China, of which one species is new to science (*C. rugosa* sp. nov.).

In the present paper, the new species are described and illustrated and keys to Chinese species of *Bicariniibracon* and *Chelonogastra* are provided.

Materials and methods

Specimen of *Bicariniibracon tricarinatus* (Cameron, 1897) was collected by sweeping nets and kept in 100% ethanol. While specimens of *Bicariniibracon concolor* sp. nov. and *Chelonogastra rugosa* sp. nov. were collected by Malaise traps. Monthly collected specimens from Malaise traps were kept in 100% ethanol. They were mounted on point-cards or with #3 insect pins.

The recognition of the subfamily Braconinae and tribes Braconini and Aphrastobraconini, based on van Achterberg (1990, 1993), Chen and van Achterberg (2019) and Quicke et al. (2023); the terminology and measurements used in this paper, follow van Achterberg (1988, 1993); and for additional references see Yu et al. (2016). The medial length of the third metasomal tergite is measured from the posterior border of the second suture to the posterior margin of the tergite.

Photographs were made with a Keyence VHX-2000 digital microscope and a Canon 6D mark II digital camera with Laowa 25mm f2.8 + 2.5–5.0 X, and apex of antenna and ovipositor with Mitutoyo 10 x. The photos were slightly processed (mainly cropped and the background modified) in Photoshop 2024. For the descriptions and measurements an Olympus SZX7 and Leica M125 stereomicroscopes were used. The specimens are deposited in the College of Chemistry and Life Sciences, Chengdu Normal University, Chengdu (CDNU) and in the Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS).

Results

Genus *Bicariniibracon* Quicke & Walker, 1991

Figs 1–4

Bicariniibracon Quicke & Walker, 1991: 419. Type species: *Atanycolus tricolor* Szépligeti, 1900.

Diagnosis. Body medium-sized. Median segments of antenna square or slightly longer than wide (Figs 1, 3), apical antennal segment rather acute, with short spine; in lateral

view scapus nearly truncate and dorsally longer than ventrally (Figs 2k, 4i); eye glabrous, not or weakly emarginated (Figs 2g, 4g); face punctate, and often with a more or less distinct triangular median area (Figs 2g, 4g); clypeus with distinct dorsal carina (Figs 2g, 4g); malar suture relatively long and distinct (Figs 2i, 4i); labio-maxillary complex normal, not elongate (Figs 2i, 4i); frons distinctly concave behind antennal sockets, with deep median groove, smooth (Figs 2h, 4h); mesosoma largely smooth and shiny (Figs 2c, 4c); notauli smooth and moderately depressed (Figs 2d, 4d); mesoscutum smooth and evenly setose; scutellar sulcus comparatively wide, with developed crenulae (Figs 2d, 4d); metanotum with or without mid-longitudinal carina; propodeum with two sub-medial carinae and nearly reaching to its anterior margin, and with distinctly lamelliform carinae sub-laterally (Figs 2d, 4j); angle between veins 1-SR and C+SC+R of fore wing about 50°; fore wing vein SR1 not reaching the tip (Figs 2a, 4a); fore wing veins 1-SR+M and 1-M not or rarely weakly curved subbasally (Figs 2a, 4a); fore wing vein cu-a interstitial; fore wing vein CU1b medium-sized, slender and reclivous (Figs 2a, 4a); vein 3-CU1 of fore wing slender; fore wing vein r oblique and shorter than width of pterostigma; second submarginal cell of fore wing long and narrow, nearly subparallel-sided or slightly narrowing distally (Figs 2a, 4a); hind wing vein SC+R1 distinctly longer than vein 1r-m (Figs 2b, 4b); hind wing with only 1 hamulus on vein R1, membrane largely glabrous near vein cu-a (Figs 2b, 4b); claws medium-sized, ventral lobe obtuse (Figs 2f, 4f); metasomal tergites largely sculptured; median area of first metasomal tergite strongly convex, with well-developed dorsal and dorso-lateral carinae and a medio-longitudinal carina, often connected with several transverse carinae laterally (Figs 2j, 4k); second metasomal tergite with small smooth medio-basal area, and connected to median carina posteriorly, median carina extends up to posterior margin of tergite and lateral grooves developed (Figs 2e, 4e); second metasomal suture deep and crenulate (Figs 2e, 4e); third and fourth metasomal tergites with antero-lateral grooves, and latero-posterior corner protruding, more or less smooth (Figs 1, 3); third to fifth metasomal tergites with rather weak transverse posterior grooves (Figs 2e, 4e); hypopygium medium-sized and slightly apically acute, not emarginate medio-apically; ovipositor normal, subapically upper valve with nodus, and its lower valve with teeth ventrally (Figs 2l, 4l).

Biology. Unknown.

Distribution. Australasian; Oriental.

Key to Chinese species of the genus *Bicarini* Quicke & Walker

- 1 First metasomal tergite with at least 6 or 7 strong and complete transverse carinae running between dorsal and dorso-lateral carinae; second metasomal tergite less than 1.5 times wider than medially long; metasomal tergites entirely black *B. carini*
- First metasomal tergite with 2–3 strong and complete transverse carinae running between dorsal and dorso-lateral carinae; second metasomal tergite 2.0 times wider than medially long; metasomal tergites yellowish or not entirely black 2

- 2 Surface of third metasomal tergite with longitudinally strigose sculpture; body uniformly yellowish; wing membrane yellowish, pterostigma and veins pale brown.....***B. concolor* sp. nov.**
- Surface of third metasomal tergite with rugose sculpture; body largely with black marks; wing membrane infuscated, pterostigma and veins dark brown...
.....***B. tricarinatus***

***Bicarini**bracon carini* Chishti & Quicke, 1993**

*Bicarini**bracon carini* Chishti & Quicke, 1993: 232.

Biology. Unknown.

Distribution. Oriental (China-Taiwan).

Note. Chishti and Quicke (1993) reported this species from Taiwan (China), but no specimens of this species are available for this study.

***Bicarini**bracon concolor* sp. nov.**

<https://zoobank.org/2CF47E8C-9424-40A1-84ED-97F9F7CA86F0>

Figs 1, 2

Type material. Holotype: CHINA • ♀; Hainan Prov., Wanning, Xinglong Tropical Botanical Garden; 18°43'51"N, 110°11'24"E; 30.vi–9.x.2021; Wang Zheng leg.; No. MT2, WZ44, 2022011 (CDNU).

Diagnosis. This new species has the body colouration very similar to *Bicarini**bracon luteus* Quicke & Walker, but can be separated from the latter by the following characters: postero-lateral lobes of third and fourth metasomal tergites rounded and not strongly protruding (acute and strongly protruding in *B. luteus*); third to fifth metasomal tergites largely longitudinally striate (only medially striate, but more confused rugulose posteriorly and laterally in *B. luteus*); hind wing vein 1r-m relatively long, 0.6 times the length of vein SC+R1 (0.4 times in *B. luteus*); first metasomal tergite with 2 strong and complete transverse carinae running between dorsal and dorso-lateral carinae (without crenulae in *B. luteus*); antenna largely dark brown, except for scapus brownish (largely brownish mustard-yellow but terminal few antennomeres mid-brown in *B. luteus*).

Description. Holotype, ♀, length of body 6.0 mm, of fore wing 5.6 mm, of ovipositor sheath 3.2 mm.

Head. Antenna incomplete, 40 segments remaining; median segments 1.3 times longer than its width; third segment 1.6 times longer than its width, 1.3 and 1.4 times longer than fourth and fifth respectively, the latter 1.3 times longer wide; length of maxillary palp 0.6 times height of head; malar suture long and distinct, with sparse short setae (Fig. 2i); clypeus height: inter-tentorial distance: tentorio-ocular distance = 5: 10: 9; clypeus with sparse long setae (Fig. 2i); eye glabrous, weakly emarginate (Fig. 2g); face moderately densely punctate, with dense and long setae (Fig. 2g); eye



Figure 1. *Bicarini concolor* sp. nov., ♀, holotype, habitus lateral.

height: shortest distance between eyes: head width = 9: 12: 23; frons moderately concave behind antennal sockets, largely smooth except for a few weak punctures, with some sparse short setae and a strong median groove (Fig. 2h); vertex with sparse weak punctures and some short setae (Fig. 2h); minimum distance between posterior ocelli: minimum diameter of elliptical posterior ocellus: minimum distance between posterior ocellus and eye = 6: 7: 20; length of malar space 1.8 times basal width of mandible; in dorsal view length of eye 2.4 times temple; temples moderately densely setose, and gradually narrowed behind eyes (Fig. 2h).

Mesosoma. Length of mesosoma 1.5 times its height (Fig. 2c); pronotum largely glabrous (Fig. 2c); anterior half of notauli deeply impressed and posterior half shallow (Fig. 2d); mesoscutum evenly densely setose; scutellar sulcus comparatively wide, with sparse (only 8) crenulae (Fig. 2d); scutellum densely setose posteriorly (Fig. 2d); metanotum convex medially, with a developed median carina anteriorly (Fig. 2d); propodeum densely setose, and somewhat longer laterally, propodeal carinae complete (Fig. 2d).

Wings. Fore wing (Fig. 2a): SR1: 3-SR: r = 34: 20: 5; 1-SR+M rather weakly curved subbasally, 1.7 times as long as 1-M; 2-SR: 3-SR: r-m = 12: 20: 9; CU1b 0.7 times as long as 3-CU1; angle between 1-SR and C+SC+R ca. 50°; cu-a interstitial. Hind wing (Fig. 2b): 1r-m straight; SC+R1: 2-SC+R: 1r-m = 40: 18: 25.

Legs. Length of fore femur: tibia: tarsus = 15: 18: 25; length of hind femur: tibia: basitarsus = 17: 20: 8; length of femur, tibia and basitarsus of hind leg 3.0, 6.6 and 4.5 times their maximum width, respectively; hind tibial spurs 0.3 and 0.4 times as long as hind basitarsus; hind femur, tibia and tarsus densely setose, setae of tarsus rather short.

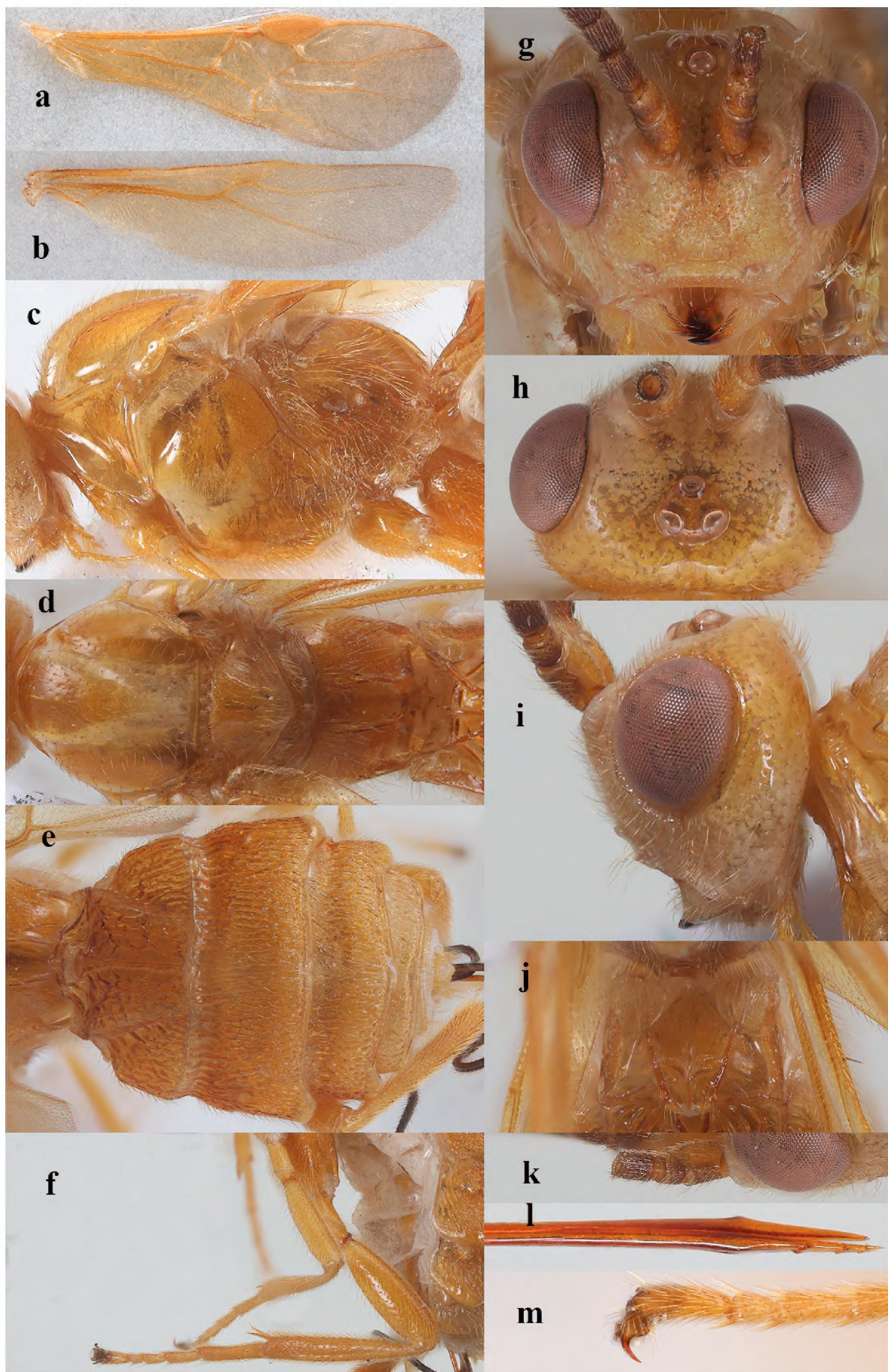


Figure 2. *Bicarini bracon concolor* sp. nov., ♀, holotype **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metasoma, dorsal view **f** hind leg, lateral view **g** head, front view **h** head, dorsal view **i** head, lateral view **j** first metasomal tergite, dorsal view **k** scapus outer side, lateral view **l** apex of ovipositor, lateral view **m** apex of hind leg, lateral view.

Metasoma. Length of first metasomal tergite about 0.8 times as long as its apical width; lateral area of first tergite comparatively wide, with 2 strong and complete transverse carinae running between dorsal and dorso-lateral carinae, and with 3 transverse carinae both sides of medio-longitudinal carina (Fig. 2j); second tergite 1.7 times wider than medially long, largely coarsely striate-sculptured except the smooth medio-basal area, lateral grooves converging posteriorly (Fig. 2e); second suture strongly crenulate, narrow and weakly curved medially, widened laterally (Fig. 2e); third to fifth metasomal tergites largely longitudinally striate-sculptured (Fig. 2e); postero-lateral lobes of third and fourth metasomal tergites smooth, rounded and not strongly protruding (Fig. 1); sixth metasomal tergite smooth and shiny; hypopygium acute apically, not reaching level of apex of metasoma; ovipositor sheath 0.6 times as long as fore wing.

Colour. Largely yellowish (Fig. 1), but antenna (except for scapus brownish), eyes, mandible apically and claws dark brown (Figs 1, 2f, g, k); notaular area and median mesoscutal lobe posteriorly pale yellow (Fig. 2d); ovipositor sheath black (Fig. 1); wing membrane yellowish, pterostigma and veins pale brown (Fig. 2a, b).

Biology. Unknown.

Distribution. Oriental (China- Hainan).

Etymology. Named after the yellowish body: “concolor” is Latin for “coloured uniformly”.

Bicarini *tricarinatus* (Cameron, 1897)

Figs 3, 4

Bicarini *tricarinatus* Cameron, 1897: 33; Szépligeti, 1904: 37; Ramakrishna Ayyar, 1924: 354.

Campyloneurus tricarinatus (Cameron): Ramakrishna Ayyar, 1928: 55; Shenefelt, 1978: 1665.

Bicarini *tricarinatus* (Cameron): Chishti & Quicke, 1993: 235.

Material. CHINA • 1♀; Yunnan Prov., Xishuangbanna Xiaomengyang; 850 m; 14.VI.1957; Wang Shuyong leg.; No. IOZ(E)1964572 (IZCAS).

Biology. Unknown.

Distribution. Oriental (China-Yunnan; India; Sri Lanka).

Note. This species is new to the fauna of China.

Genus *Chelonogastra* Ashmead, 1900

Figs 5, 6

Chelonogastra Ashmead, 1900: 139; Watanabe, 1937: 16; Shenefelt, 1978: 1669; Quicke, 1987: 107. Type species: *Chelonogastra koebelei* Ashmead, 1900 (monobasic and original designation).

Iphiaulax (*Chelonogastra*): Fahringer, 1928: 589.



Figure 3. *Bicarini bracon tricarinatus* (Cameron, 1897), ♀, habitus lateral.

Diagnosis. Body small to medium-sized; terminal antennomere often rather acute apically (Fig. 6o); in lateral view scapus gradually narrowed basally, truncate apico-laterally, ventrally more or less as long as dorsally (Fig. 6n); eye setose, weakly emarginated (Fig. 6j); face coarsely rugose or punctate, often densely setose (Fig. 6j); clypeus without dorsal carina (Fig. 6j); malar suture often sculptured (Fig. 6l); labio-maxillary complex normal, not elongate (Fig. 6l); frons weakly concave behind antennal sockets, with some setae and a median groove (Fig. 6k); occiput normal (Fig. 6k), or sometimes with distinct lateral tubercles; mesosoma densely setose (Fig. 6c); middle lobe of mesoscutum nearly truncate anteriorly, not strongly produced in front of the lateral lobes (Fig. 6d); notauli moderately deep and complete, sometimes only shallow subposteriorly (Fig. 6d); precoxal suture absent; pleural suture smooth; scutellar sulcus moderately wide and crenulate (Fig. 6d); metanotum convex medially, and with a short median carina anteriorly (Fig. 6e); propodeum largely smooth and densely setose, without medio-longitudinal carina or groove (Fig. 6e); propodeal spiracle round, near middle of propodeum, and without tubercle above it (Fig. 6c); angle between veins 1-SR and C+SC+R of fore wing about 60°; vein SR1 not reaching tip of fore wing (Fig. 6a); fore wing veins 1-M and 1-SR+M nearly straight (Fig. 6a); fore wing vein cu-a more or less interstitial (Fig. 6a); fore wing



Figure 4. *Bicarini tricarinatus* (Cameron, 1897), ♀ **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metasoma, dorsal view **f** hind leg, lateral view **g** head, front view **h** head, dorsal view **i** head and scapus outer side, lateral view **j** propodeum, dorsal view **k** first metasomal tergite, dorsal view **l** apex of ovipositor, lateral view.

vein CU1b medium-sized, slender and reclivous (Fig. 6a); second submarginal cell of fore wing moderately short, and subparallel-sided (Fig. 6a); hind wing vein SC+R1 distinctly longer than vein 1r-m (Fig. 6b); membrane more or less evenly setose or largely glabrous near vein cu-a (Fig. 6b); lobes of tarsal claws usually large, with setae (Fig. 6h); metasoma

robust; metasomal tergites (at least second and third) often largely and coarsely sculptured (Fig. 6f); first metasomal tergite largely coarsely sculptured except for the median area, which slightly convex and largely smooth, and without medio-longitudinal carina (Fig. 6m); lateral grooves of first metasomal tergite wide and crenulate; second metasomal tergite with a small rugose medio-basal area and connected to median carina posteriorly, lateral grooves crenulate (Fig. 6f); second metasomal suture deep and crenulate (Fig. 6f); third to fifth metasomal tergites with antero-lateral areas, and latero-posterior corner more or less protruding (Fig. 6g); female with posterior margin of fifth metasomal tergite broadly emarginate (Fig. 6g); hypopygium medium-sized and apically acute; upper valve of ovipositor without nodus subapically, and its lower valve without ventral teeth (Fig. 6i).

Biology. Unknown.

Distribution. Oriental, Afrotropical, Eastern Palearctic.

Key to Chinese species of the genus *Chelonogastra* Ashmead

- 1 Body with head and metasoma black, mesosoma reddish yellow; medio-basal area of second metasomal tergite coarsely rugose..... *C. rugosa* sp. nov.
- Body almost entirely black; medio-basal area of second metasomal tergite smooth 2
- 2 Fourth and fifth metasomal tergites similar striate as first three tergites and without granulation; body length 6.0–8.0 mm *C. formosana*
- First three metasomal tergites coarsely rugose, fourth and fifth tergites granulate; body length 5.5–6.0 mm..... *C. koebelei*

Chelonogastra formosana Watanabe, 1937

Chelonogastra koebelei forma *formosana* Watanabe, 1937: 17.

Chelonogastra formosana Watanabe: Watanabe, 1961: 363; Chou, 1981: 73.

Biology. Unknown.

Distribution. Oriental (China-Taiwan; Thailand; Japan).

Note. Watanabe (1937) reported this species from Taiwan (China), but no specimens of this species are available for this study.

Chelonogastra koebelei Ashmead, 1900

Chelonogastra koebelei Ashmead, 1900: 139, 1906: 195; Watanabe, 1934: 184, 1937: 17; Chou, 1981: 73.

Iphiaulax (Chelonogastra) koebelei (Ashmead): Fahringer, 1928: 591.

Biology. Unknown.

Distribution. Oriental (China-Taiwan; Thailand; Japan).

Note. Watanabe (1934) reported this species from Taiwan (China), but no specimens of this species are available for this study.

***Chelonogastra rugosa* sp. nov.**

<https://zoobank.org/4B41AAE4-970F-464A-8799-364EF5CB3BFE>

Figs 5, 6

Type material. *Holotype*: CHINA • ♀; Hainan Prov., Danzhou, Southern Medicinal Botanical Garden; 19°30'50.46"N, 109°30'1.05"E; 30.IX–31.X.2020; Chen Longlong leg.; No. HN4, LSX901, 2022021 (CDNU). *Paratypes*: CHINA • 2♀♀; same data as for holotype; No. HN5, LSX903, 2022051–2022052 (CDNU) • 2♀♀; Hainan Prov., Wenchang Tongguling Nature Reserve, road side; 137m; 19°40'19.19"N, 111°0'44.6"E; 4–15.III.2020; Xu Chunyang leg.; No. TGL2, PYQ401, 2022053–2022054 (CDNU) • 1♀; Hainan Prov., Wenchang Tongguling Nature Reserve, cropland; 11 m; 19°40'19.19"N, 111°0'44.6"E; 15.iv–2.v.2020; Xu Chunyang leg.; No. TGL3, PYQ413, 2022055 (CDNU).

Diagnosis. This new species with very similar metasoma to *Chelonogastra formosana* Watanabe, 1937, but can be separated from the latter by the following characters: mesoscutum reddish yellow (black in *C. formosana*); relatively small-sized, length of body of female 2.5–3.9 mm (6.0–8.0 mm in *C. formosana*); occiput without lateral tubercle (with distinct lateral tubercles in *C. formosana*); medio-basal area of second metasomal tergite coarsely rugose (smooth in *C. formosana*).



Figure 5. *Chelonogastra rugosa* sp. nov., ♀, holotype, habitus lateral.

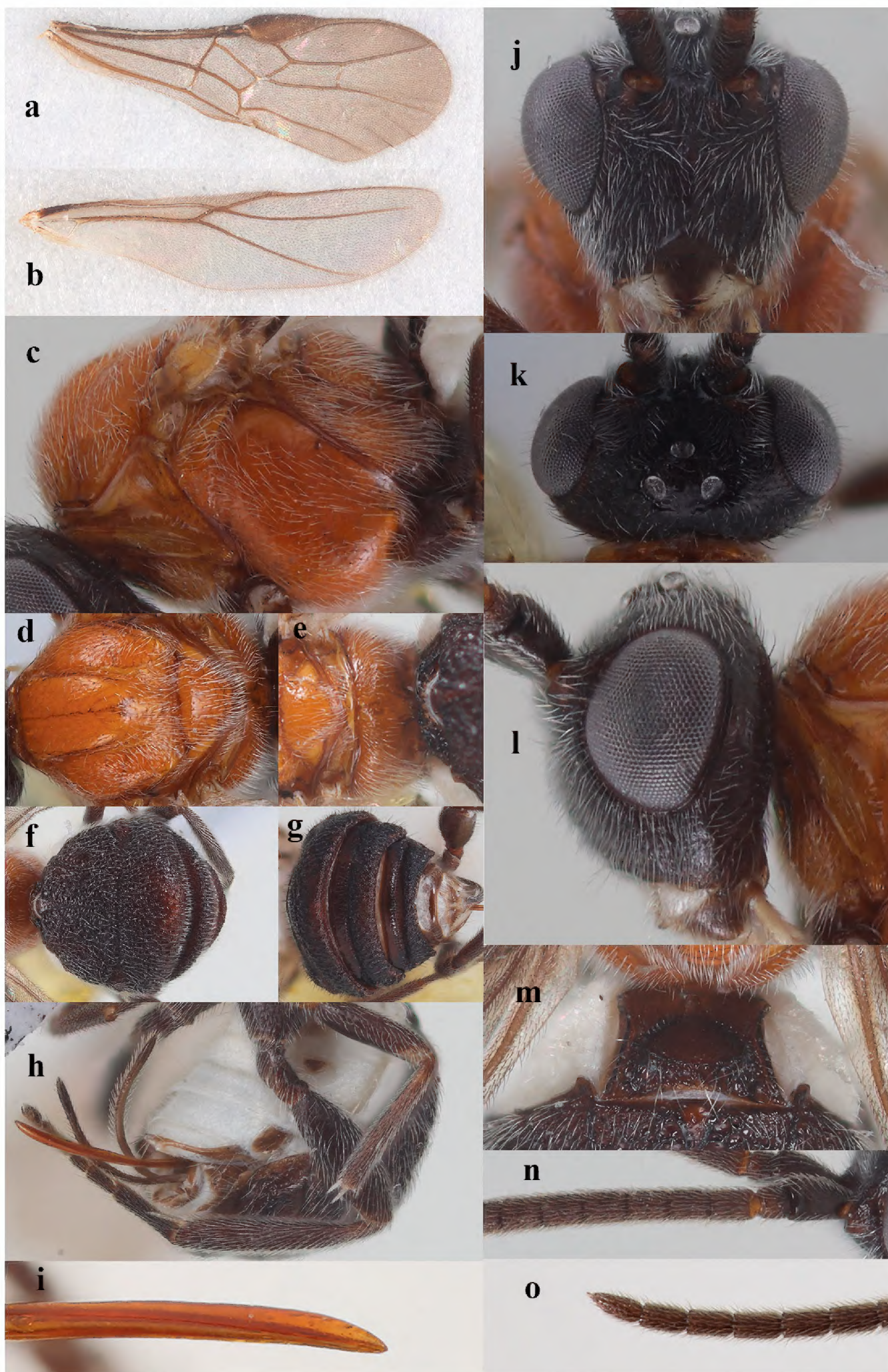


Figure 6. *Chelonogastra rugosa* sp. nov., ♀, holotype **a** fore wing **b** hind wing **c** mesosoma, lateral view **d** mesosoma, dorsal view **e** metanotum and propodeum, dorsal view **f** second and third metasomal tergites, dorsal view **g** fourth and fifth metasomal tergites, dorsal view **h** hind leg, lateral view **i** apex of ovipositor, lateral view **j** head, front view **k** head, dorsal view **l** head, lateral view **m** first metasomal tergite, dorsal view **n** scapus outer side, lateral view **o** apex of antenna.

Description. Holotype, ♀, length of body 2.7 mm, of fore wing 3.0 mm, of ovipositor sheath 1.0 mm.

Head. Antenna with 31 segments; apical antennal segment rather acute, with short spine, 2.7 times longer than its maximum width (Fig. 6o); penultimate segment 1.9 times longer than its width, and 0.8 times as long as apical antennomere; median segments 1.5 times longer than wide; third segment 1.4 times longer than wide, 1.0 and 1.0 times longer than fourth and fifth, respectively, the latter 1.5 times longer than wide; length of maxillary palp 0.6 times height of head; malar suture rugose, and densely setose (Fig. 6l); clypeus height: inter-tentorial distance: tentorio-ocular distance = 19: 37: 20; clypeus with sparse, long setae (Fig. 6l); eye with sparse short setae, weakly emarginate (Fig. 6j); face with some punctures, and densely setose (Fig. 6j); eye height: shortest distance between eyes: head width = 12: 13: 25; frons sparsely punctate, and weakly concave behind antennal sockets, with a median groove (Fig. 6k); vertex largely smooth except for a few weak punctures, and with some sparse short setae (Fig. 6k); minimum distance between posterior ocelli: minimum diameter of elliptical posterior ocellus: minimum distance between posterior ocellus and eye = 6: 4: 11; length of malar space 2.1 times longer than basal width of mandible; in dorsal view length of eye 2.7 times temple; temples sparsely setose, and directly narrowed behind eyes (Fig. 6k); occiput without lateral tubercle (Fig. 6k).

Mesosoma. Length of mesosoma 1.4 times its height (Fig. 6c); notauli developed and complete (Fig. 6d); mesoscutum densely short setose; scutellar sulcus comparatively wide and deep, with crenulae (Fig. 6d); scutellum densely short setose, especially posteriorly (Fig. 6d); metanotum convex medially, with median carina (Fig. 6e); propodeum largely smooth, but with sparse setae medially, and dense, long setae laterally, without medio-longitudinal carina or groove (Fig. 6e).

Wings. Fore wing (Fig. 6a): angle between 1-SR and C+SC+R approximately 62°; SR1: 3-SR: r = 48: 27: 11; 1-SR+M straight, 2.0 times as long as 1-M; 2-SR: 3-SR: r-m = 5: 9: 4; 2-SR+M largely not sclerotised; CU1b 0.6 times as long as 3-CU1; cu-a interstitial. Hind wing (Fig. 6b): 1r-m straight; SC+R1: 2-SC+R: 1r-m = 17: 5: 6.

Legs. Length of fore femur: tibia: tarsus = 24: 34: 21; length of hind femur: tibia: basitarsus = 19: 25: 10; length of femur, tibia and basitarsus of hind leg 2.5, 6.6 and 4.7 times their maximum width, respectively; hind tibial spurs 0.3 and 0.4 times as long as hind basitarsus; hind femur, tibia and tarsus densely setose, setae of tarsus rather short.

Metasoma. Length of first metasomal tergite 0.8 times its apical width, median area convex and reticulate sculptured posteriorly (Fig. 6m); lateral grooves of first tergite comparatively wide, with crenulae; second tergite largely coarsely sculptured, including medio-basal area (Fig. 6f); antero-lateral grooves of second tergite moderately narrow and shallow, with crenulae; second suture crenulate, wide and distinctly curved medially, narrow laterally (Fig. 6f); third to fifth tergites largely coarsely sculptured except apically, and with antero-lateral grooves (Fig. 6f, g); hypopygium acute apically, not reaching level of apex of metasoma; ovipositor sheath 0.3 times as long as fore wing.

Colour. Head largely black (Fig. 5), but mandible whitish (except apically) (Fig. 6j); mesosoma largely reddish yellow (Fig. 6c, d, e); fore legs largely blackish brown except femur apically, tibia and tarsus reddish yellow (Fig. 5); middle

and hind legs blackish brown (Figs 5, 6h); metasoma blackish brown (Fig. 6f, g); ovipositor sheath black (Fig. 5); wing membrane infuscated, pterostigma and veins dark brown (Fig. 6a, b).

Variation. Length of body of female 2.5–3.9 mm, of fore wing of female 2.9–4.3 mm, and of ovipositor sheath 0.8–1.7 mm; antenna of female with 33 antennomeres; apical antennomere 2.0 times longer than its maximum width; penultimate antennomere 1.7 times longer than its maximum width, and 0.8 times as long as apical antennomere; length of mesosoma 1.1–1.3 times its height.

Biology. Unknown.

Distribution. Oriental (China- Hainan).

Etymology. Named after the entirely coarsely rugose second to fifth metasomal tergites: “rugosa” is Latin for “rugose”.

Acknowledgements

The authors thank Huayan Chen for providing the specimens. We also thank Mrs Hong Liu (IZCAS) for the loan of specimens. We are grateful to the editor and reviewers for improving this paper. This work was supported by the General Program of National Natural Science Foundation of China (32100360), the Sichuan Provincial Natural Science Foundation Project (2024NSFSC1321), the Foundation of Chengdu Normal University Talent Introduction Research Funding (YJRC202009, No. 111/111158701), the Special Funding for Tianfu Emei Talent Project (51000022T000004883381) and the Key International Joint Research Program of National Natural Science Foundation of China (31920103005).

References

- Ashmead WH (1900) Classification of the Ichneumon flies, or the superfamily Ichneumonoidea. *Proceedings of the United States National Museum* 23(1206): 1–220. <https://doi.org/10.5479/si.00963801.23-1206.1>
- Cameron P (1897) *Hymenoptera Orientalia*, or contribution to a knowledge of the Hymenoptera of the Oriental Zoological Region. Part V. *Memoirs and Proceedings of the Manchester Literary and Philosophical Society* 41(4): 1–144.
- Chen X-X, van Achterberg C (2019) Systematics, phylogeny and evolution of braconid wasps: 30 years of progress. *Annual Review of Entomology* 64: 335–358. <https://doi.org/10.1146/annurev-ento-011118-111856>
- Chishti MJK, Quicke DLJ (1993) A new species and new combination in the genus *Bicarini-bracon* Quicke et Walker (Hymenoptera: Braconidae: Braconinae) with a revised key to species. *Entomologist's Monthly Magazine* 129(1552–1555): 231–236.
- Chou LY (1981) A preliminary list of Braconidae (Hymenoptera) of Taiwan. *Journal of Agricultural Research, China* 30(1): 71–88.

- Fahringer J (1928) Opuscula braconologica. Band 1. Palaearktischen Region. Lieferung 7–9. Opuscula braconologica. Fritz Wagner, Wien, 433–606.
- Quicke DLJ (1987) The old world genera of braconine wasps (Hymenoptera: Braconidae). Journal of Natural History 21: 43–157. <https://doi.org/10.1080/00222938700770031>
- Quicke DLJ, Jasso-Martínez JM, Ranjith AP, Sharkey MJ, Manjunath R, Naik S, Hebert PDN, Priyadarsanan DR, Thurman J, Butcher BA (2023) Phylogeny of the Braconinae (Hymenoptera: Braconidae): A new tribal order!. Systematic Entomology, 1–26. <https://doi.org/10.1111/syen.12608>
- Quicke DLJ, Walker C (1991) A new Indo-Australian genus of Braconinae (Insecta, Hymenoptera, Braconidae). Zoologica Scripta 20: 419–424. <https://doi.org/10.1111/j.1463-6409.1991.tb00305.x>
- Ramakrishna Ayyar TV (1924) A catalogue of the braconid wasps described from the Indian region. Proceedings of the Fifth Entomological Meeting held at Pusa 1923 5(1923): 352–362.
- Ramakrishna Ayyar TV (1928) A contribution to our knowledge of south Indian Braconidae. Part I. Vipioninae. Memoirs of the Department of Agriculture in India (Entomological Series) 10(3): 29–60.
- Shenefelt RD (1978) Hymenopterorum catalogus (nov. editio). Pars 15. Braconidae 10. Braconinae, Gnathobraconinae, Mesostoinae, Pseudodicrogeniinae, Telengainae, Ypsistocerinae plus Braconidae in general, major groups, unplaced genera and species. Dr. W. Junk B. V., The Hague, Holland, 1425–1872.
- Szépligeti G (1904) Hymenoptera. Fam. Braconidae. Genera Insectorum 22: 1–253.
- van Achterberg C (1988) Revision of the subfamily Blacinae Foerster (Hymenoptera, Braconidae). Zoologische Verhandlungen Leiden 249: 1–324.
- van Achterberg C (1990) Illustrated key to the subfamilies of the Holarctic Braconidae (Hymenoptera: Ichneumonoidea). Zoologische Mededelingen Leiden 64: 1–20.
- van Achterberg C (1993) Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). Zoologische Verhandlungen Leiden 283: 1–189.
- Watanabe C (1934) H. Sauter's Formosa-Collection: Braconidae. Insecta Matsumurana 8(4): 182–205.
- Watanabe C (1937) A contribution to the knowledge of the Braconid fauna of the Empire of Japan. Journal of the Faculty of Agriculture, Hokkaido (Imp.) University 42: 1–188.
- Watanabe C (1961) Notes on Braconidae (Hymenoptera) of Thailand. Nat. & Life Southeast Asia 1: 363–365.
- Yu DS, van Achterberg C, Horstmann K (2016) Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive. Nepean, Ontario, Canada. www.taxapad.com